

July 26, 2006

Mr. Forrest Siebken  
City of Milford  
505 1<sup>st</sup> Street  
Milford, NE 68405

**RE: 505 1st Street, Milford, Nebraska  
City Hall**

Pursuant to your request, Structural Design Group performed a visual observation of the aforementioned property on July 10, 2006. The purpose of the observation was to determine the reasons for the noticeable settlement near the front vault area and provide an overall observation of the existing building structure. Destructive examination and the observation of the roof framing or members were not within the scope of services.

Photographs of the building and the reported area of settlement are included in this report. For reference purposes, a sketch of the basement area denoting the three separate additions is included in the appendix portion of the report.

It should be noted that the opinions and conclusions stated herein are based on information available as of this writing. It is conceivable that additional information may be forthcoming which bears on these opinions and conclusions. The right is reserved to review and modify all opinions and conclusions at any future point in time should additional information become available.

## DESCRIPTION

The structure is comprised of an original building and two separate additions beginning on the south side of the original building and extending south. The garage addition was not reviewed for this report. It is currently believed that the original building was constructed in the late 1800's; however, this was not verified. The original building and first addition are single story wood framed structures with partial basements. The second addition is a single story wood framed structure with a complete basement.

The original building plan can be seen in the first page of the appendix. The first floor framing consists of 2x12 joists at 1'-4" o.c. that span east/west and bear on interior and exterior brick masonry walls for the crawl space area. As you move south the interior bearing transitions to a 5 3/4"x6" wood header and then to the west brick masonry wall under the vault. The northwest corner of the crawl space

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 2 of 20

framing has been reworked to allow for the ramp system into the building. A partial basement is defined by single wythe brick masonry walls that continue to the south with a concrete slab-on-grade floor system. A masonry wall defines the periphery of the vault and is the southeast extremity of the original building. At the time of the site visit the roof structure was not observed due to the direct attachment of the original ceiling structure. The roof framing members are assumed to span the full building width east/west as there are no observed load carrying members spanning north/south.

The first addition building plan can be seen on the second page of the appendix. The first floor framing consists of 2x12 joists at 1'-4" o.c. that span east/west between the clay tile masonry wall on the east and the interior bearing clay tile masonry wall on the west. Directly to the west of the interior bearing wall is an abandoned coal shoot or exterior stair that has since been covered with infill floor framing. The southern endwall of the first addition is a combination of clay tile masonry with a brick veneer. A concrete slab-on-grade floor system is present through out the basement area. The concrete vault floor slab is visible and has since been supported by a newer concrete masonry unit wall. The basement walls do align with the hallway walls above which could allow for an interior bearing condition for the roof framing members.

The second addition plan can be seen on the third page of the appendix. The basement walls consist of concrete masonry units, with a thickness of 8" on the east and 10" on the west. The floor framing consists of 2x10 joists at 1'-4" o.c. spanning east/west between the exterior concrete masonry walls with an interior bearing on (3) 2x8 header that is supported by 4x6 wood posts. The northwest corner of the exterior concrete masonry wall supports a portion of the existing brick masonry wall. A concrete slab-on-grade floor system is present throughout the basement area. The basement stair entrance runs adjacent to a portion of the east wall with non-load bearing wood partition walls separating storage and shelving units. A supporting member that aligns with the west side of hallway was observed in the meeting room on the first floor providing a possible interior bearing condition for the roof members

## OBSERVATIONS

The original building, first addition, and second addition plans showing locations of specific observations and Figures, can be found in the appendix. Each item listed below is viewed as a deficiency in the building and something that must be repaired.

### Item 1.

A significant portion of the original building's exterior walls exhibit efflorescent stains. This occurs when masonry becomes saturated and the moisture dries out

the soluble salts which are left behind as a deposit on the face of the wall. Most often these deposits are found to emanate, not from the brick, but from the mortar joints. As this continually occurs the masonry and mortar deteriorate and break apart. In all cases, brick and mortar remnants were observed at the base of the wall.

Item 2.

An effect this moisture has on the structure is the deterioration of any wood that is in contact with the wall. In the original building and additions the wood floor joist are "toothed" into the wall. Specifically along the east wall of the original building this can be seen with the result being the visible settlement of the floor around the vault area.

Item 3.

An existing undersized wood header acts as an interior bearing support that has notches and drilled holes throughout its span. The bearing condition consists of (2) 2x10's that are wedged between the bottom of the joist and the single wythe masonry wall. This load has caused considerable cracking in the wall.

Item 4.

The single wythe brick wall that forms the perimeter of the partial basement under the original building is failing with multiple cracks throughout the wall and horizontal movement at the top of the wall. It is currently acting as a retaining wall, but it has no capacity to resist the loads imparted on it. There does not appear to be any type of foundation under this other than the concrete slab-on-grade floor system.

Item 5.

A portion of what appears to be the footing of the west exterior wall is visible and it is located above the single width brick retaining wall. This creates a substantial lateral load on the wall that it is not designed to resist. Again, through this exposed area, efflorescence is visible and the deterioration of the wall is evident based on the build up of mortar and brick remnants at the base of the wall.

Item 6.

The existing header that spans the plumbing chase under the bathroom is not properly sized.

Item 7.

Existing wood beam that spans the second addition is undersized for the considered first floor live load. At this time it is not known if the roof system contributes any load to this. The existing 4x6 wood columns have no positive connection to the floor or footing.

11-32  
505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 4 of 20

Item 8.

Extensive water damage is apparent around the bathroom facility. Prolonged exposure to this type of moisture can lead to mold and rotting issues.

Item 9.

The east concrete block wall is showing signs of moisture through staining and the "blistering" of the paint. The extents of the damage are not known and were not observed in any other exposed location in this area. Note that the south wall is furred out by a wood stud wall.

### CONCLUSIONS and RECOMMENDATIONS

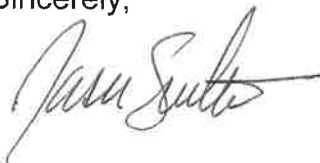
Extensive remedial work in the form of removal and replacement of the masonry walls that are currently showing excessive signs of moisture infiltration will be required to insure their future stability. The floor joists that have experienced the deterioration due to the moisture will need to be replaced. Interior bearing headers that do not meet the design requirements will need to be replaced with solid bearing to a suitable foundation element.

If the partial basement in the original building is to be kept, the existing single width masonry wall should be removed and replaced with reinforced cast-in-place concrete or concrete masonry unit walls. Either option shall be designed according to required lateral pressures taking into account the possible adjacent footing loads that are occurring.

Removal of the furring studs in and around the bathroom should occur to investigate the possibility that the structure has been compromised by water damage.

Thank you for the opportunity to provide you with this brief report. Please do not hesitate to contact me with any questions you may have relating to this correspondence or if I may be of further service to you.

Sincerely,



Jason L. Suelter, P.E.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 5 of 20



Figure A. Crawl space joist at deteriorated bearing.



Figure B. Crawl space joist at deteriorated bearing and wall efflorescence.

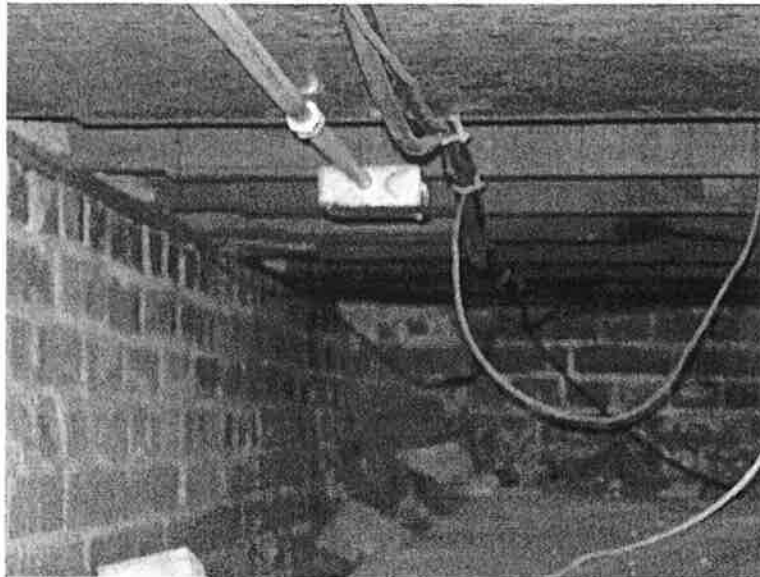


Figure C. Crawl space joist at wall efflorescence and deterioration.

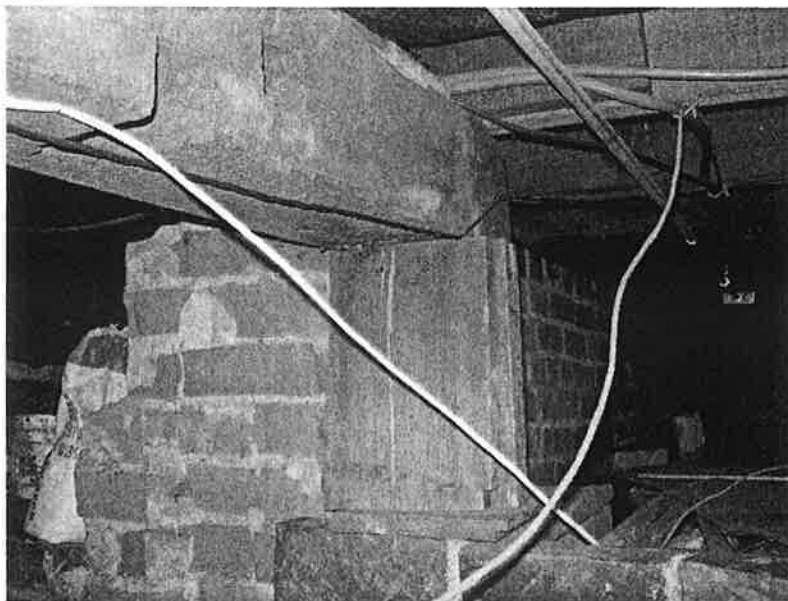


Figure D. Floor joist bearing at header condition in original building.

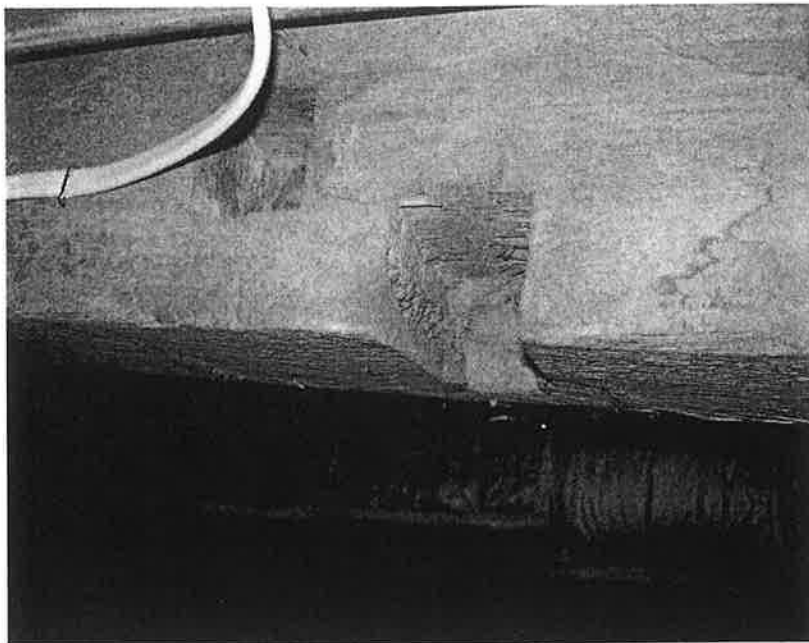


Figure E. Existing load bearing header.

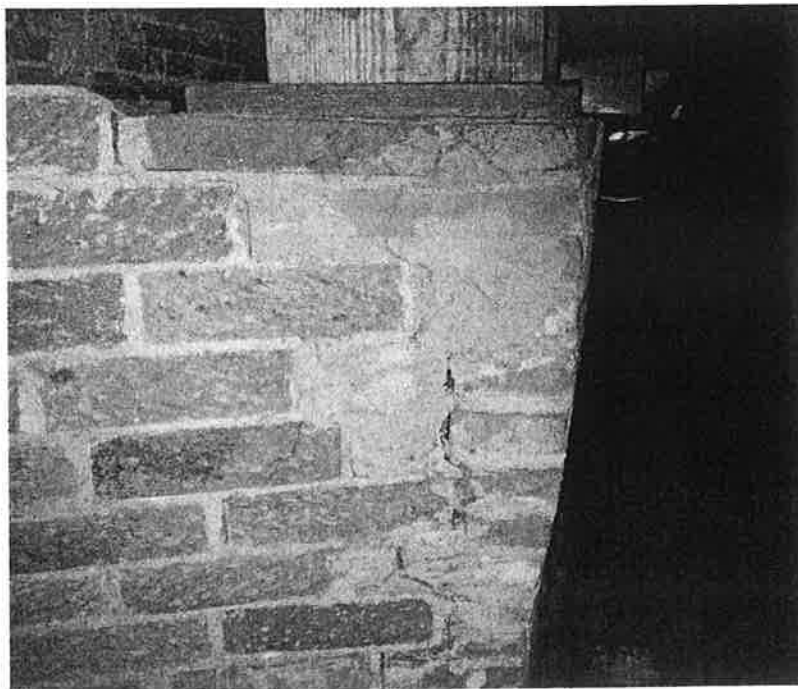


Figure F. Header bearing on single wythe masonry wall.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 8 of 20



Figure G. Crack propagation through wall at header bearing.



Figure H. Altered floor framing for ramp addition.



505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 9 of 20

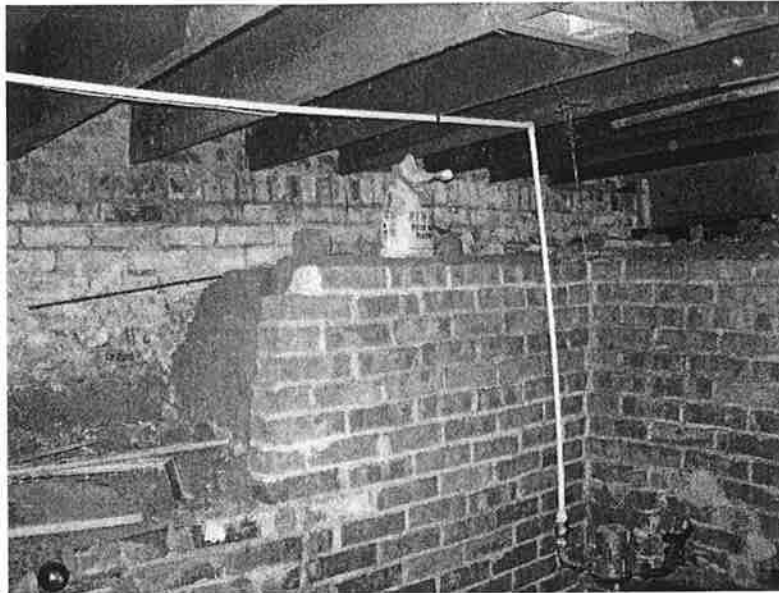


Figure J. Single wythe retaining walls in partial basement.

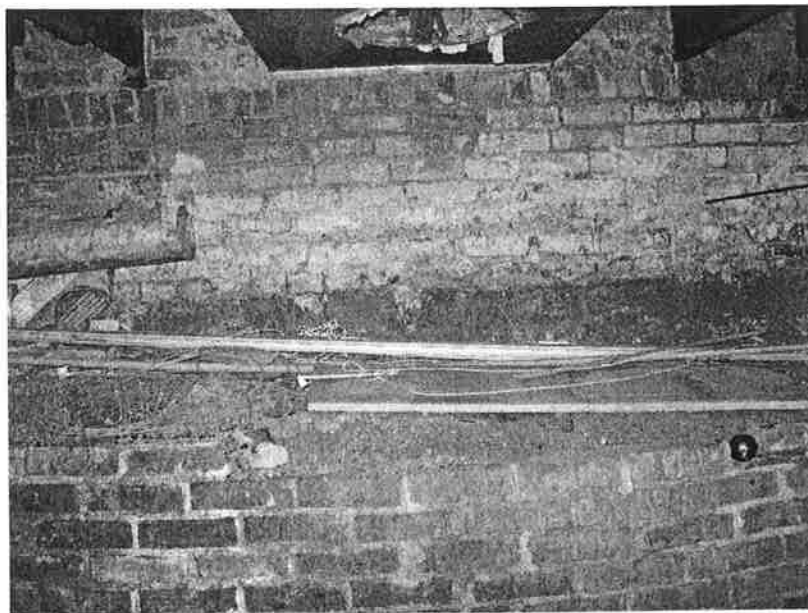


Figure K. West exterior bearing wall in original additional above partial basement elevation with signs of moisture seepage.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 10 of 20

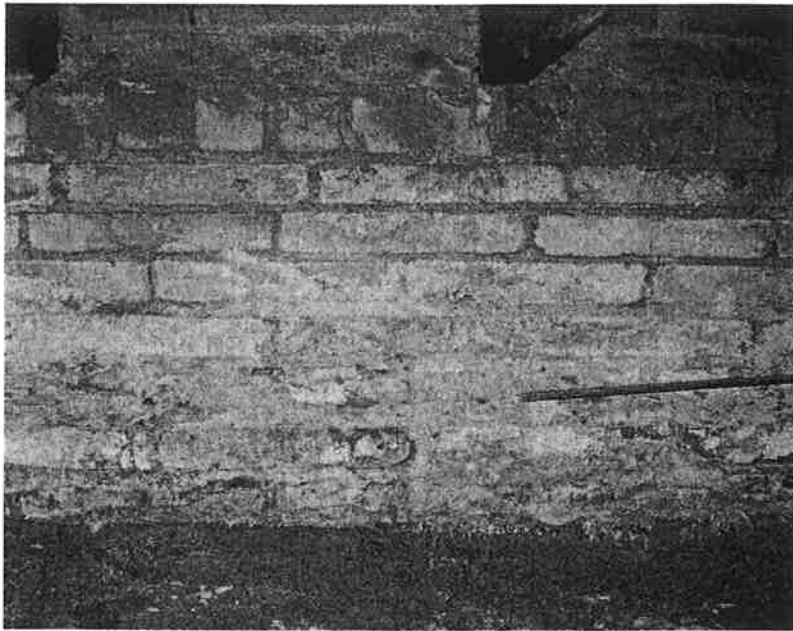


Figure L. West exterior bearing wall exposed footing with efflorescence and deterioration.

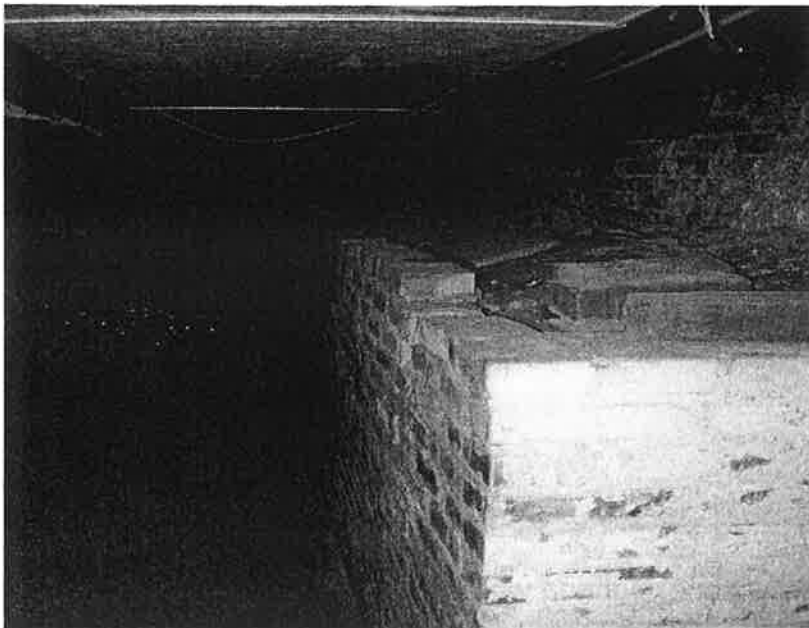


Figure M. East single wythe masonry wall next to vault.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 11 of 20



Figure N. West single wythe masonry wall next to vault.

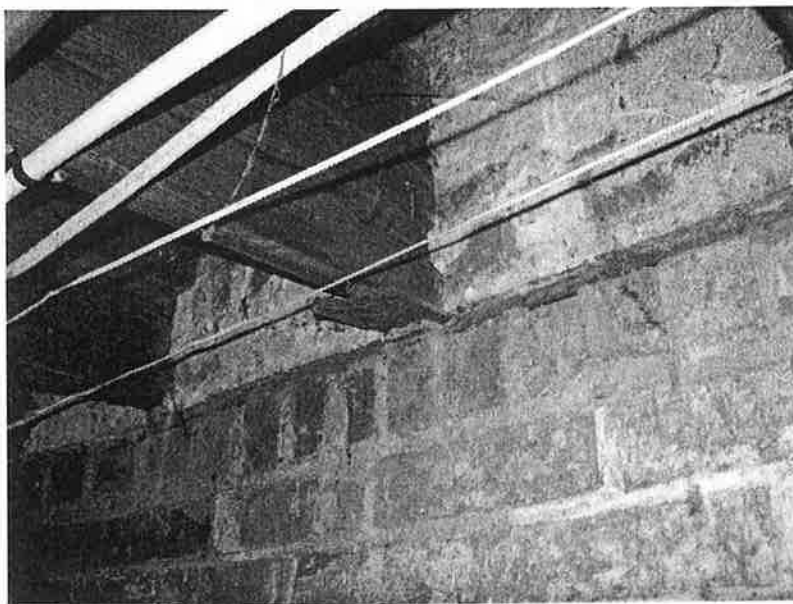


Figure O. Joist bearing on vault wall.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 12 of 20



Figure P. Vault bearing with efflorescence and deterioration.

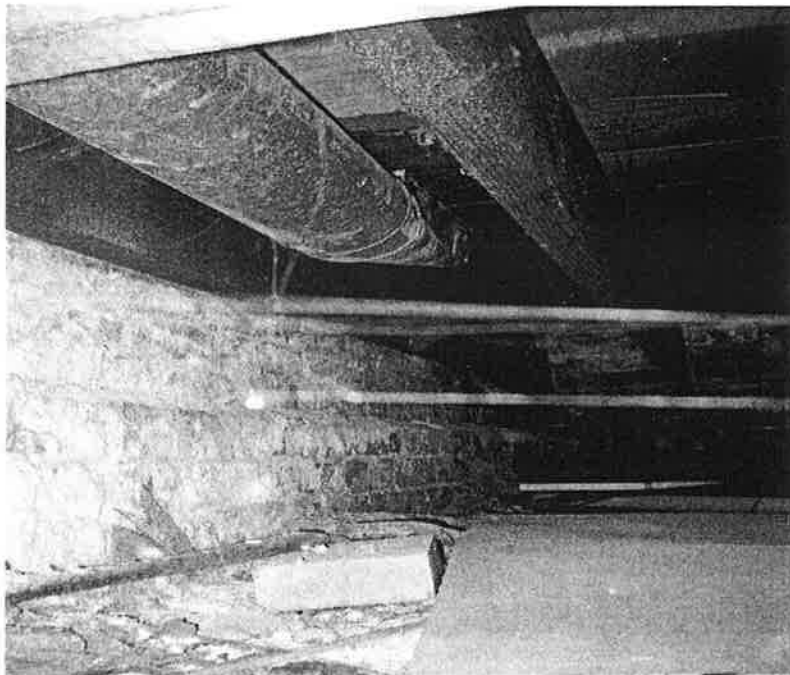


Figure Q. Southern vault wall in bathroom plumbing chase with efflorescence and deterioration.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 13 of 20

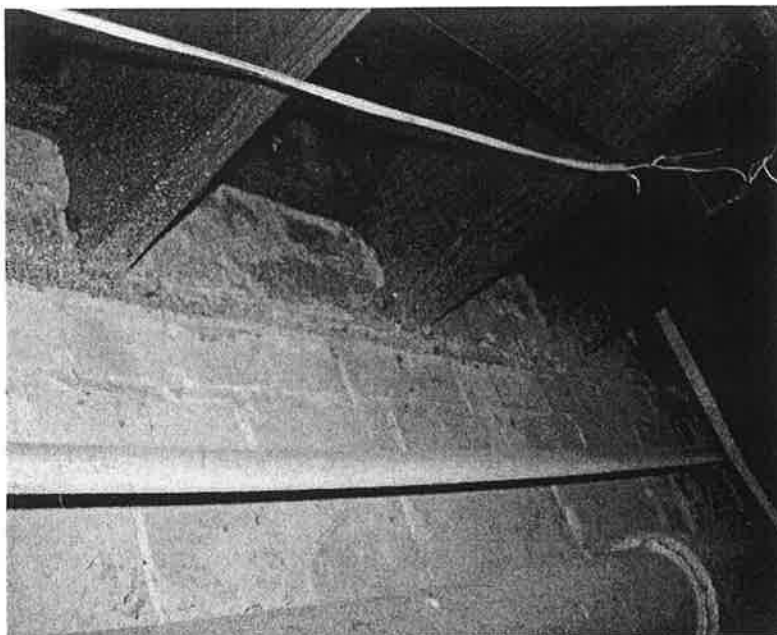


Figure R. 1<sup>st</sup> addition joist bearing at vault wall.

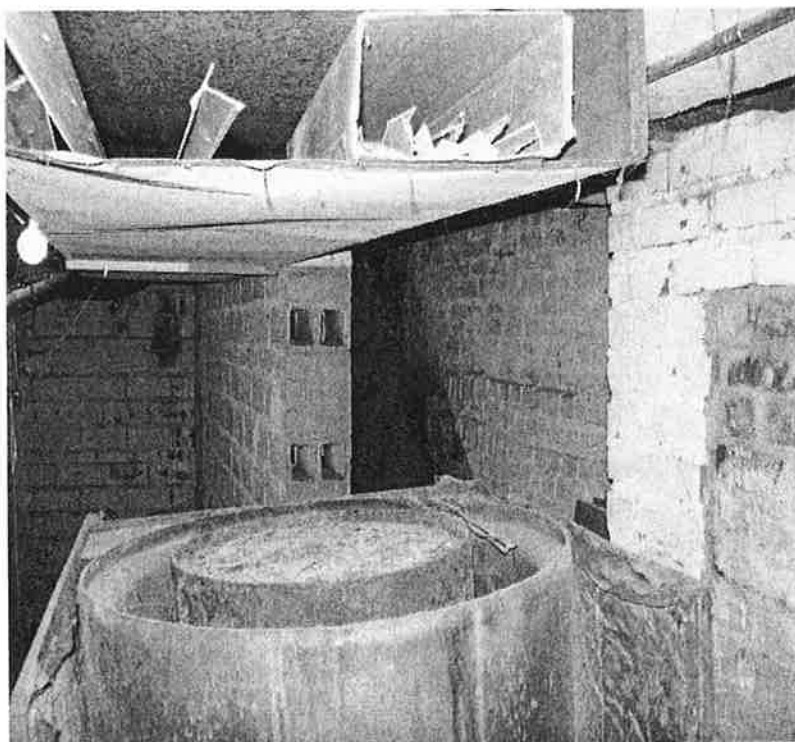


Figure S. 1<sup>st</sup> addition south and intermediate bearing wall at infilled coal/stair shaft.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 14 of 20

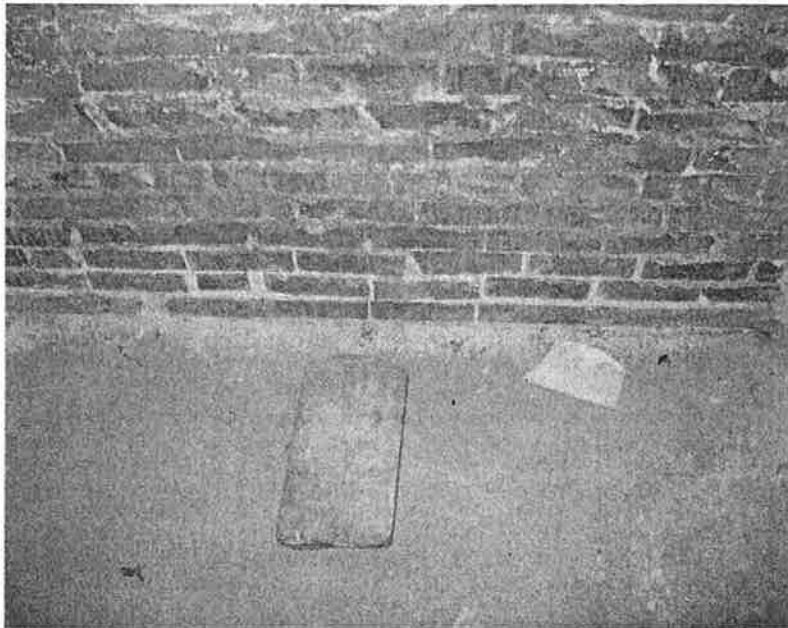


Figure T. Deterioration of 2<sup>nd</sup> addition north wall.

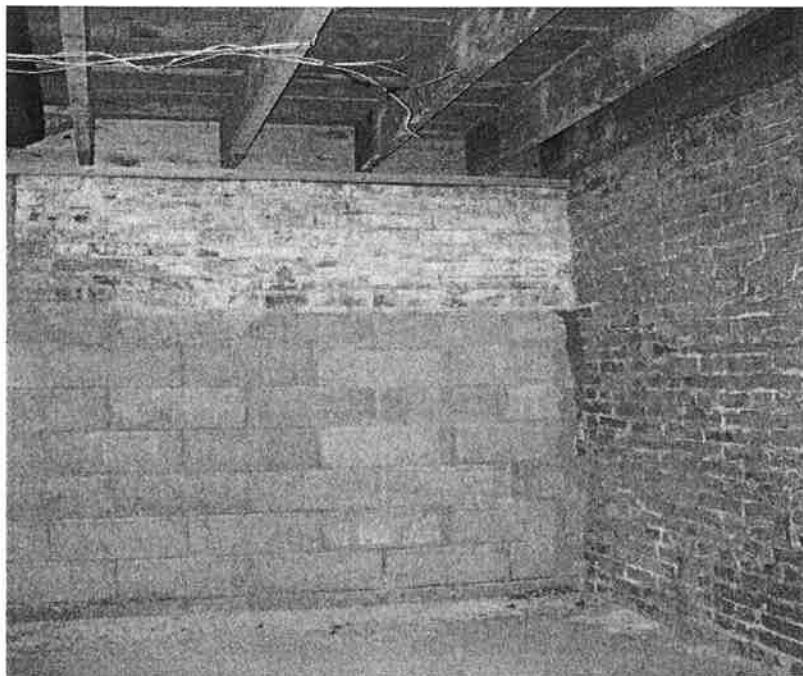


Figure U. West concrete masonry unit wall supporting existing brick masonry wall.



505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 15 of 20

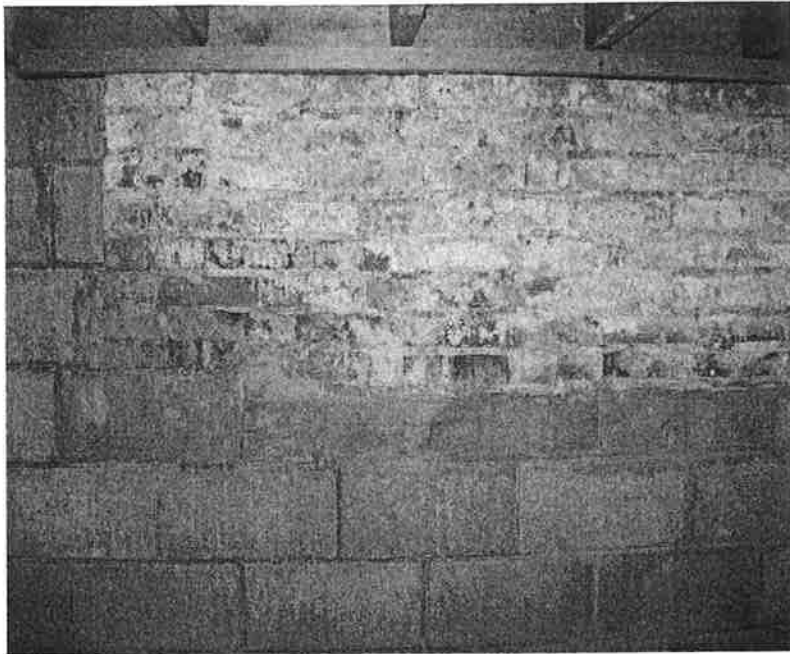


Figure V. Deterioration & efflorescence of existing supported masonry wall.

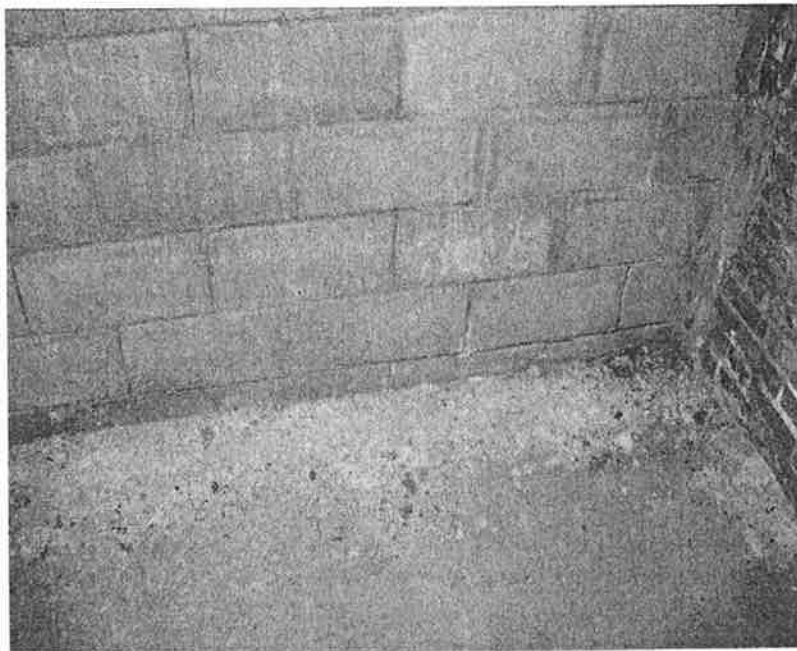


Figure W. Remnant brick and mortar below deteriorated wall.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 16 of 20

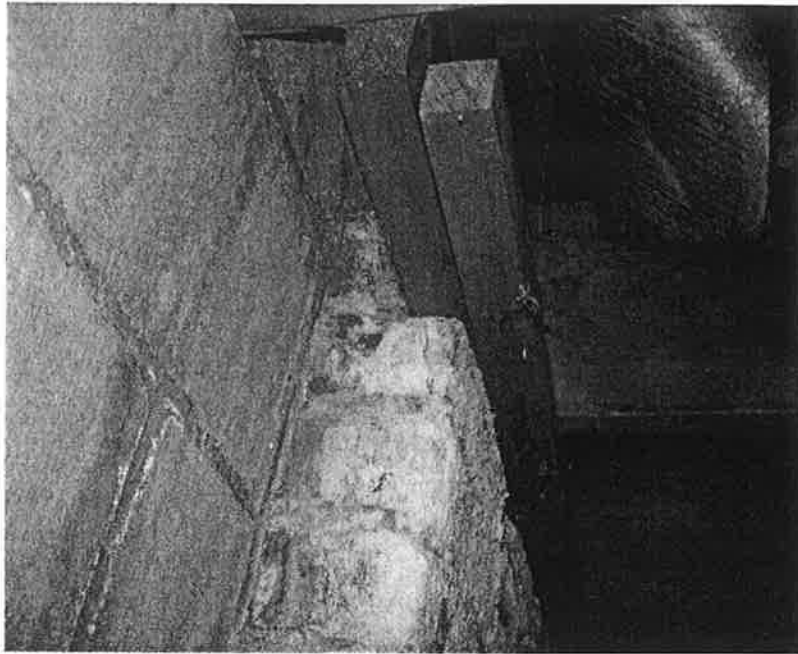


Figure X. Joist bearing along deteriorated wall.



Figure Y. Vault for supported by new c.m.u. wall.



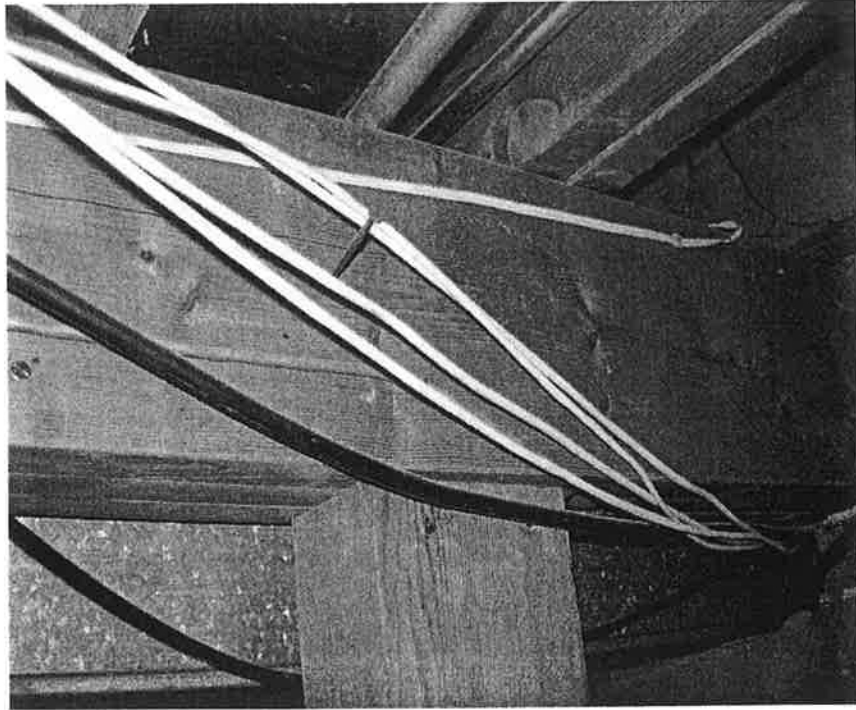


Figure Z. Wood header beam supported by wood column.

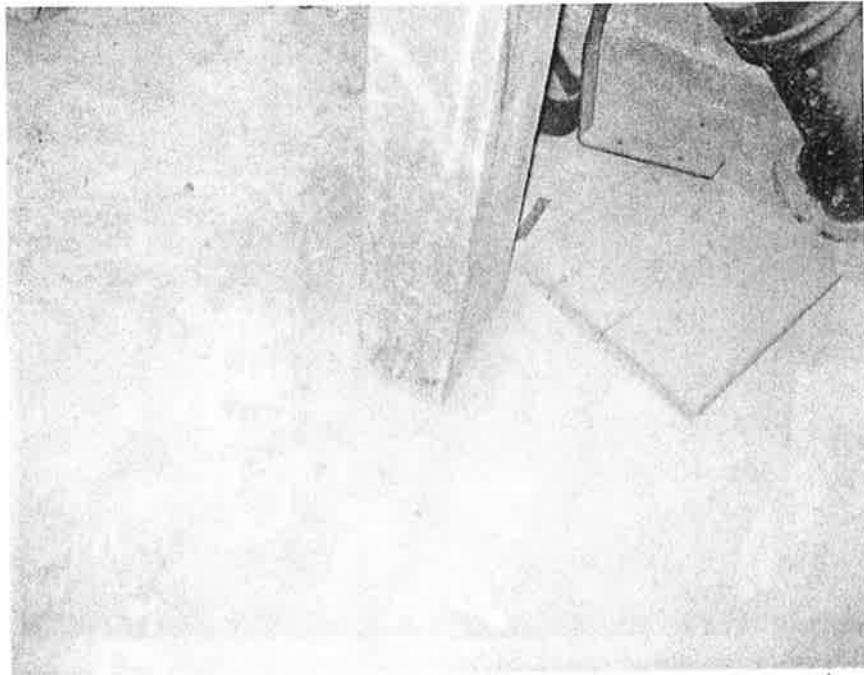


Figure A1. Wood column bearing on slab.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 18 of 20



Figure B1. 2<sup>nd</sup> addition east bearing c.m.u. wall.

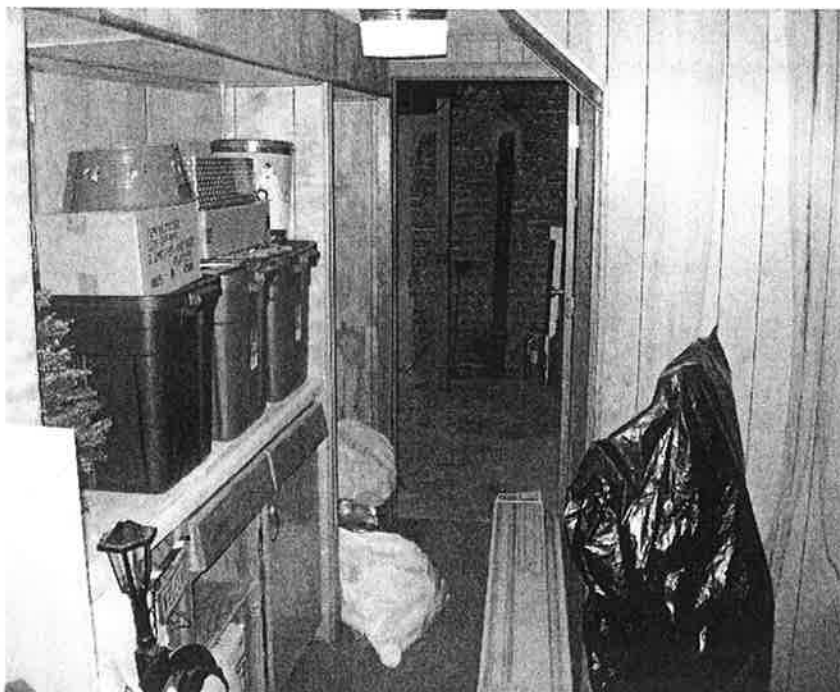


Figure C1. 2<sup>nd</sup> addition corridor entrance into the 1<sup>st</sup> addition.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 19 of 20

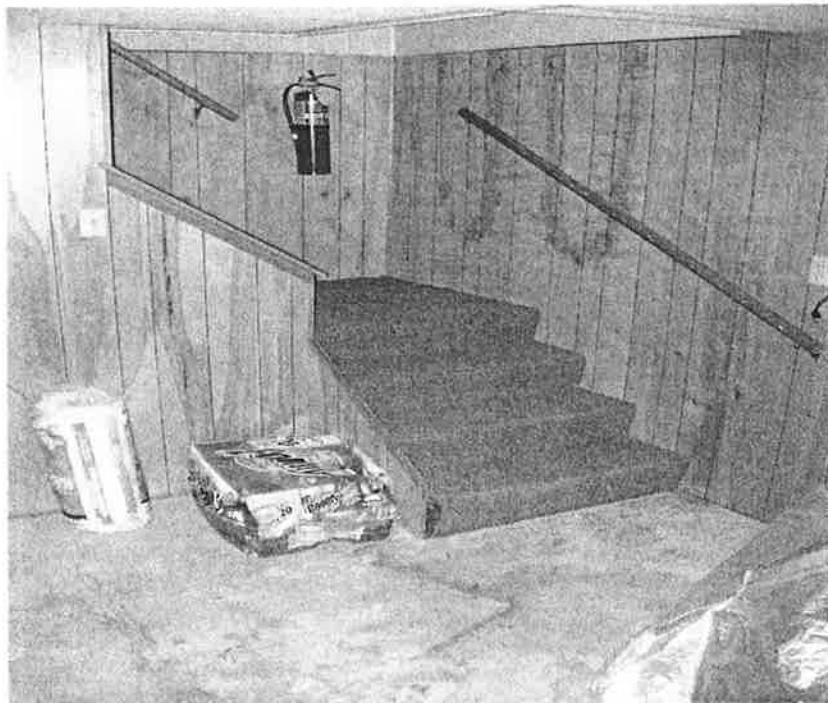


Figure D1. Stair entrance into the 2<sup>nd</sup> addition basement.



Figure E1. Water damage to bathroom and surrounding area.

505 1<sup>st</sup> Street, Milford, Nebraska  
City Hall  
July 26, 2006  
Page 20 of 20

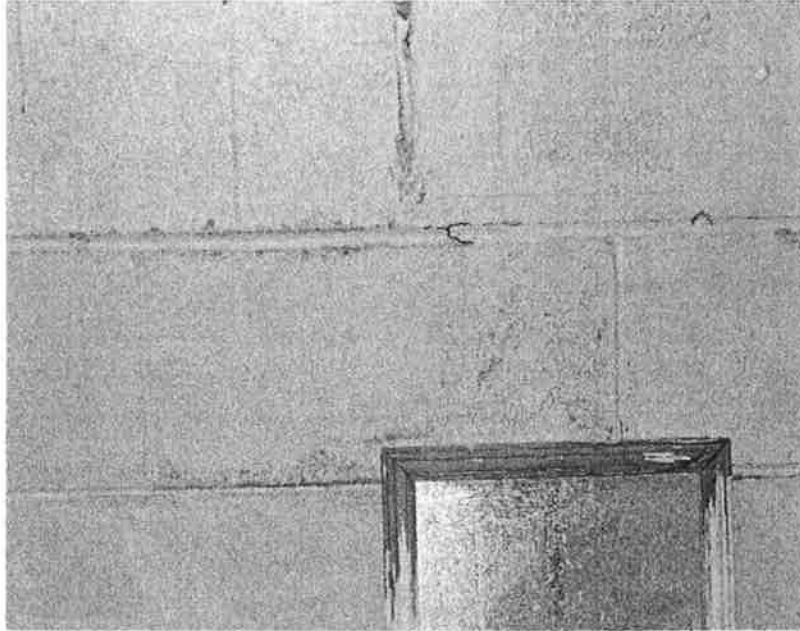
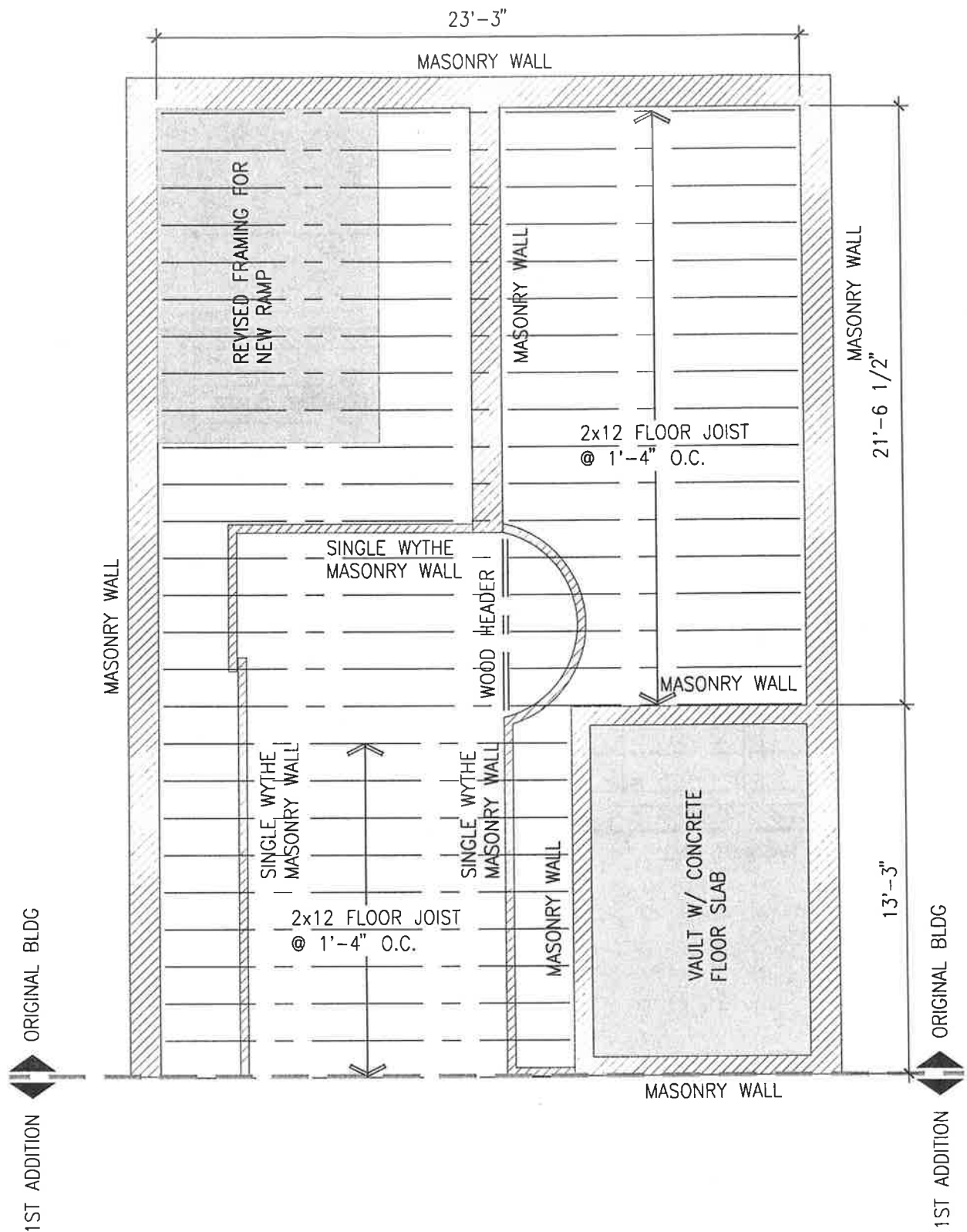


Figure F1. Moisture apparent through paint “blistering” in bathroom area.

Appendix Legend

- A.1 Original Building Basement Floor Plan
- A.2 First Addition Basement Floor Plan
- A.3 Second Addition Basement Floor Plan
- A.4 Original Building Observation and Figure Plan
- A.5 First Addition Basement Observation and Figure Plan
- A.6 Second Addition Observation and Figure Plan.

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Milford City Hall

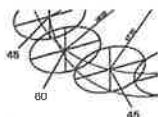
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26 JULY 2006  
PROJECT:  
SDG 06-084

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lincoln, nebraska 68508

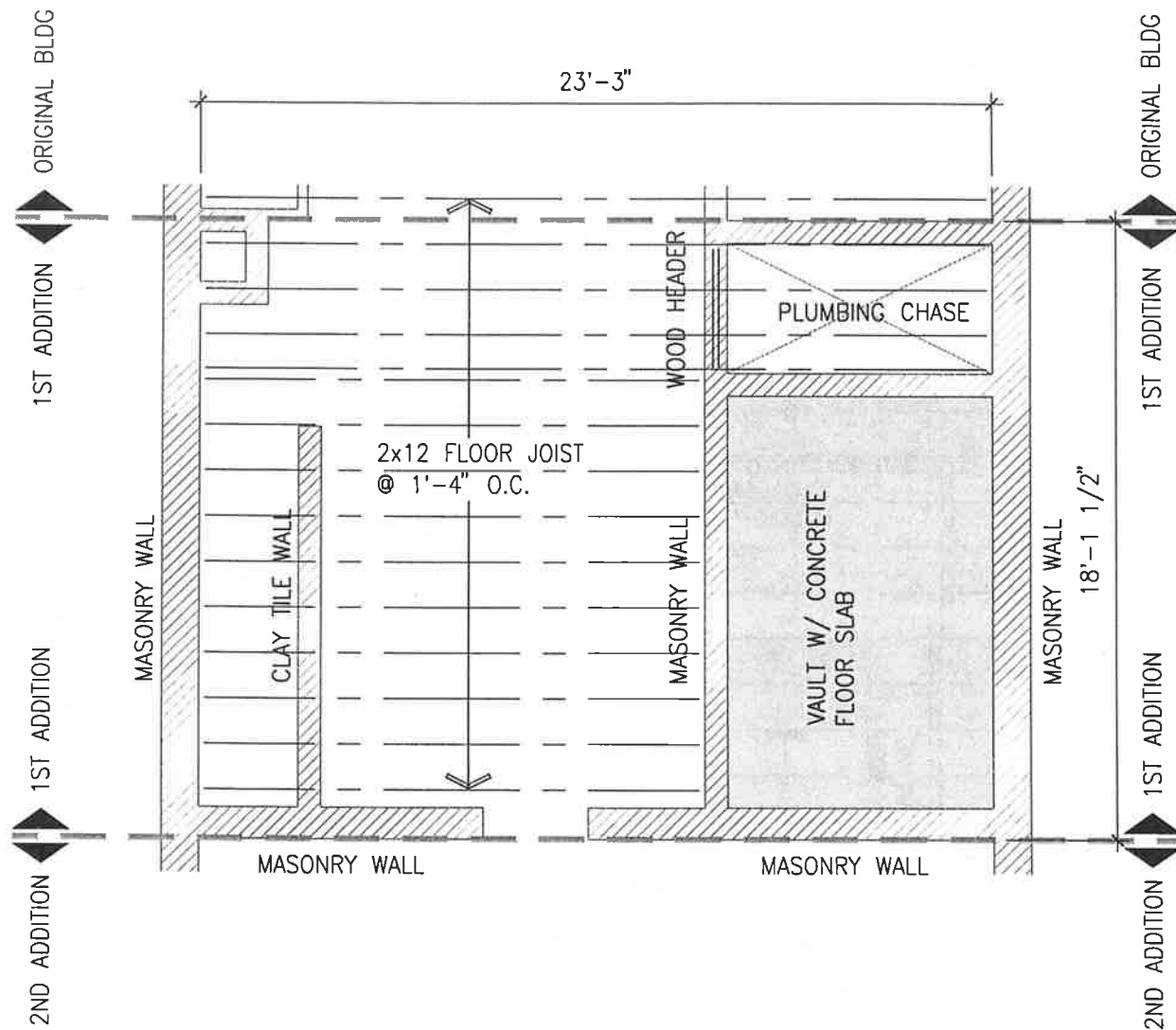
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Existing Floor Plan

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Original Building



Midford City Hall

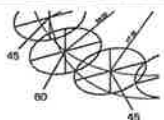
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SDG 06-084

A.2

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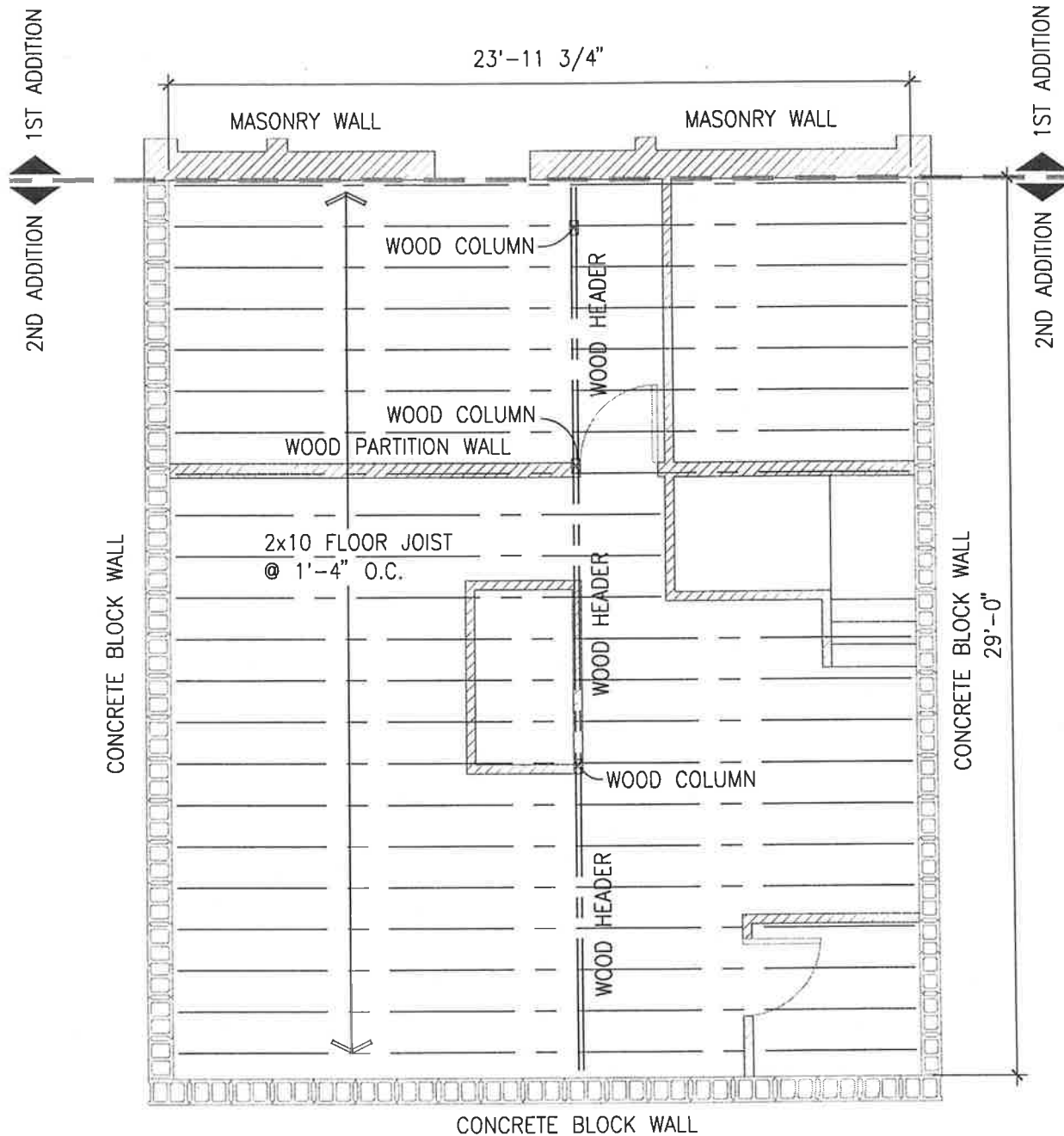


Existing Floor Plan

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1st Addition Building

1632'



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26 JULY 2006  
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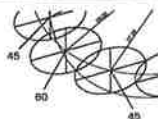
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lincoln, nebraska 68508

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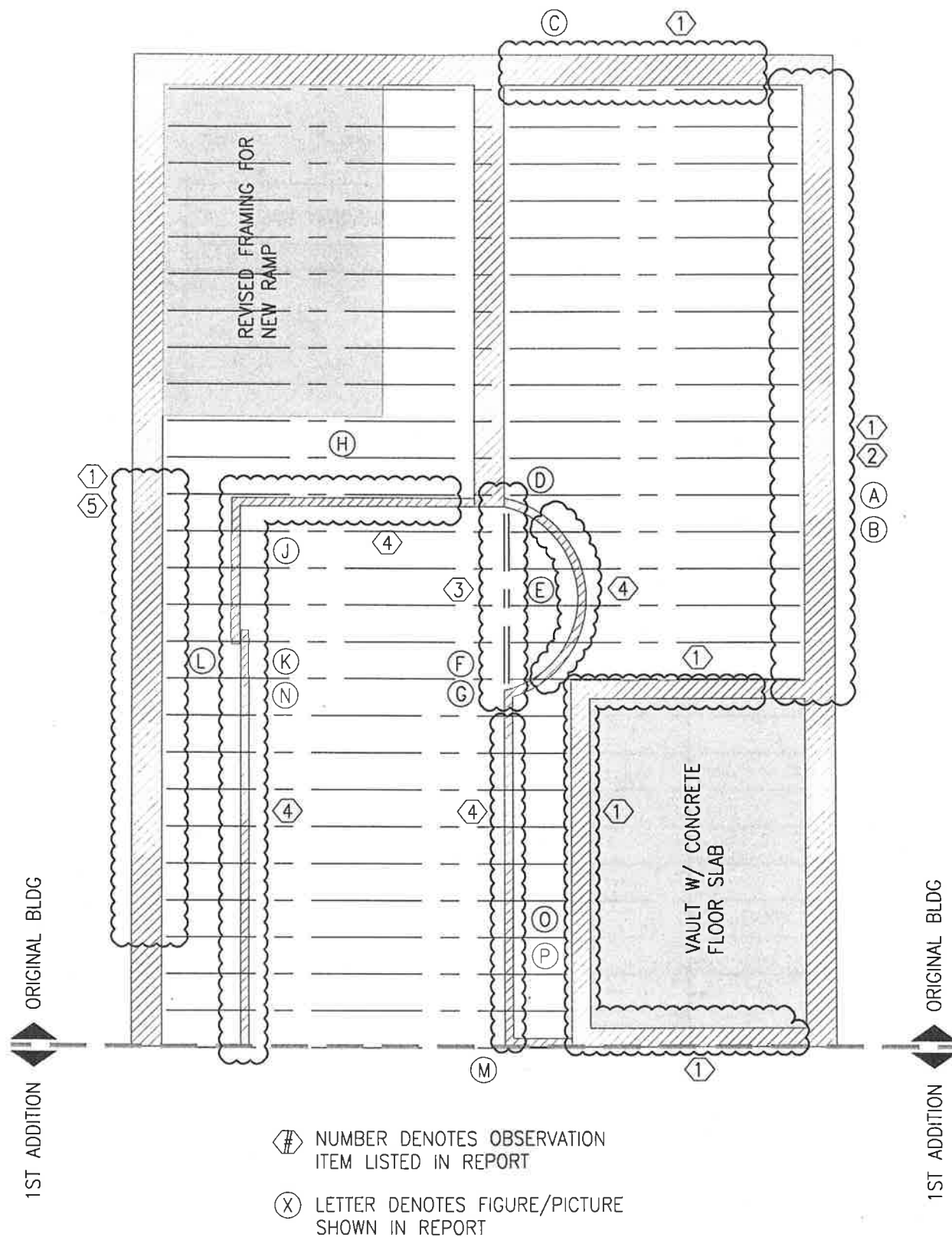
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Existing Floor Plan

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2nd Addition Building



Milford City Hall

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A.4

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the grainger building  
105 north 8th street, suite 100a  
lincoln, nebraska 68508

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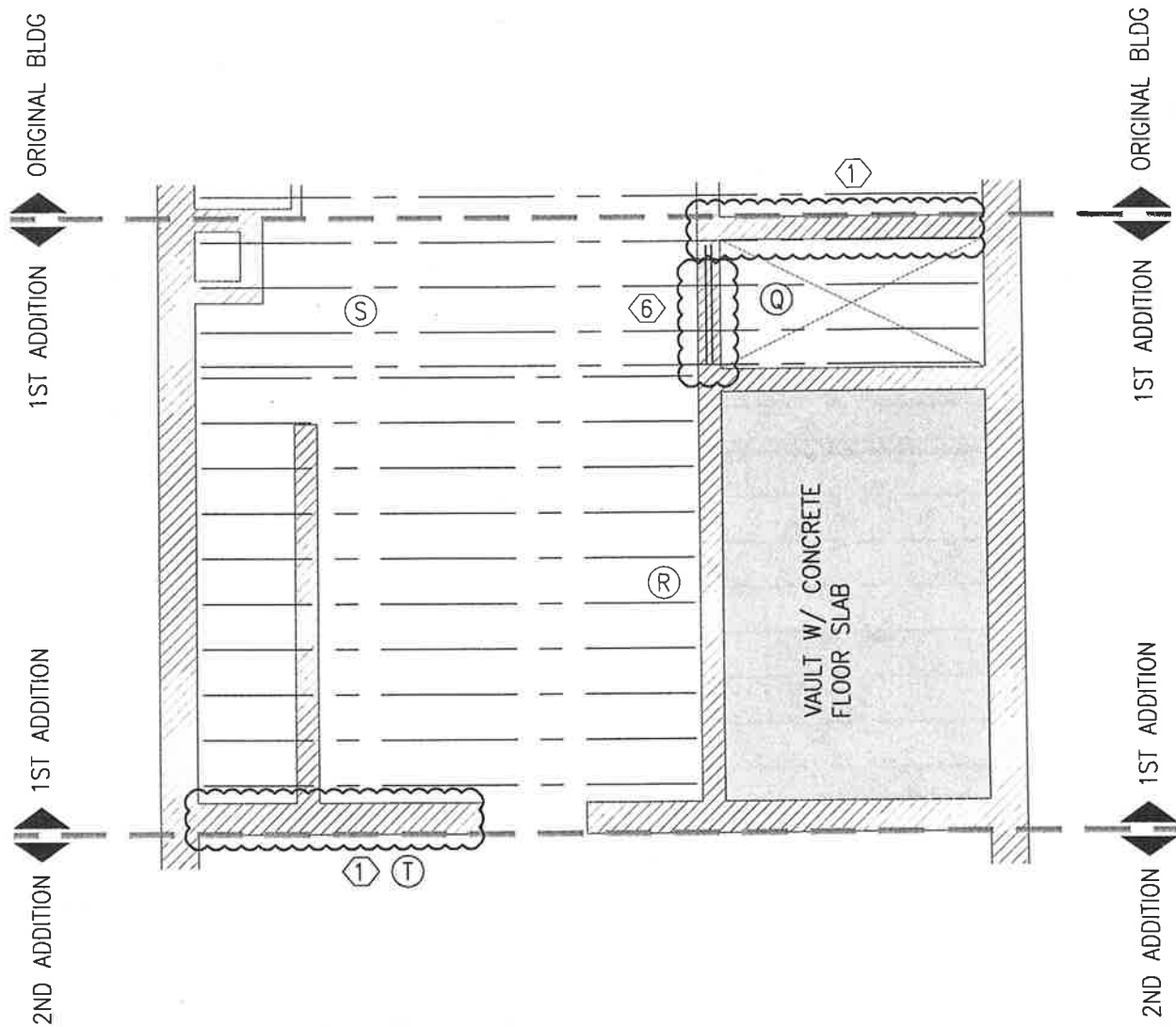


Observation Plan

Scale: 3/16" = 1'-0"

Original Building





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ITEM LISTED IN REPORT

ⓧ LETTER DENOTES FIGURE/PICTURE  
SHOWN IN REPORT

Wilford City Hall

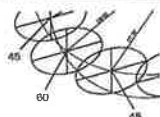
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PROJECT:  
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A.5

structural [design] group

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lincoln, nebraska 68508

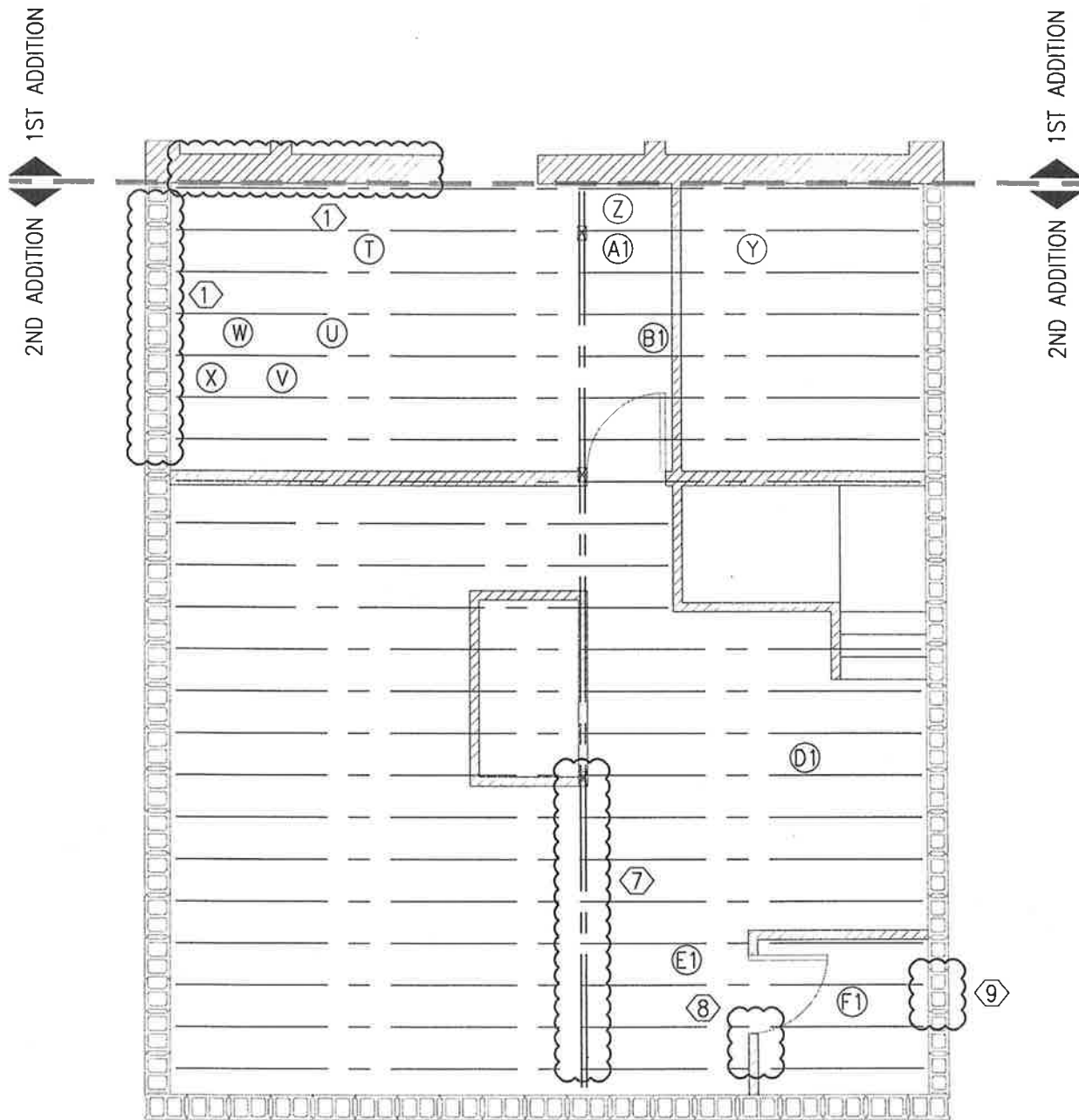
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Observation Plan

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1st Addition Building



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